The Journal of High Energy Physics
A successful experience of electronic publishing

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Abstract

The Journal of High Energy Physics (JHEP) is a scientific journal written, run, and distributed by electronic means, that encompasses all areas of High Energy Physics. JHEP began its publication in July 1997, and is now established as one of the leading journals in the field of High Energy Physics. It can also be considered a model for developing other scientific journals in different disciplines.

The online publication of papers is made possible by the complete automation of the editorial work that is carried out by means of a software robot, thereby reducing costs and speeding up the procedure. At present JHEP is available at eight nodes that are updated in real time by means of an innovative software. Special multimedia facilities has been added to enhance the possibilities offered by the Web.

The quality of the journal is guaranteed by the Advisory and Editorial Boards, composed by the most distinguished scientists in the field.

The Journal

The Journal of High Energy Physics (JHEP) is a scientific journal written, run and distributed by electronic means. It is made possible by the existence of the World Wide Web on the Internet and by its extensive use by the international community of physicists. The purpose in running such a journal is to explore the new media and take advantage of their innovative qualities: rapidity of communication, broad diffusion and low costs.

JHEP began its publication in July 1997. The initial focus was on Theoretical High Energy Physics due to the fact that this community of physicists is accustomed to the extensive use of electronic means for a wide variety of purposes, and the Journal was a natural outgrowth of this. The success that we have had in this field has convinced us that we are on the right track. Therefore, the Journal has been extended to encompass Experimental High Energy Physics.

JHEP is structured as follows:

- The Advisory Board (consisting of a group of distinguished scientists) is the keeper of the scientific policy of the journal;
- The Editorial Board (consisting of leading scientists pertaining to a wide number of fields) acts as mediator between the authors and the referees;

- The Executive Office (based at the International School for Advanced Studies - SISSA - in Trieste) is responsible for running the journal. The Executive Office is composed by two executive editors, one system manager, one senior software engineer, three junior software engineers and two TeX engineers.

E. Rabinovici (Jerusalem, Israel)
V. Rittenberg (Bonn, Germany)
G. Rolandi (CERN LEP)
E. Roulet (Valencia, Spain)
A. Schwimmer (Weizmann, Israel)
M. Testa (Rome, Italy)
Y. Totsuka (Kamiokande)
B. Webber (Cambridge, UK)

The journal is currently produced for the high-energy physics community but the same model (and the same software robot) may be used to create similar journals in other fields.

The software robot

The JHEP is a software robot which consists of families of scripts. All interfaces with the robot are either via e-mail or accessible on the Net by means of any standard browser (and optimized for Netscape Navigator 3.0 or later).

There are three major families of programs. The first allows the interaction between JHEP and the scientific community, and it is the section where papers are published. The submission procedure is also part of this family of programs. The second family runs the interface among editors, between editors and referees, and between editors and authors. The third family is in charge of the administration of the journal.

In addition to these scripts, there is a program, *Harold*, dedicated to updating in real time the journal's network of nodes throughout the world (see below *Harold the Herald*).
The challenge is to use this robot to carry out many of the menial tasks that make the running of a scientific journal expensive and slow. This program has been implemented in successive steps and is now fully working. Further upgradings will follow as new possibilities are explored.

Harold the Herald

To assure reliability and fast connections, JHEP is a network of nodes throughout the world. Currently active sites are

http://jhep.sissa.it	http://jhep.cern.ch
http://jhep.yukawa.kyoto-u.ac.jp	http://jhep.jinr.ru
http://jhep.tifr.res.in	http://jhep.mse.jhu.edu
http://jhep.ift.unesp.br	http://jhep.weizmann.ac.il

All nodes are equivalent. The program *Harold* has been developed in order to keep them synchronized. All events taking place at any of the nodes are notified to the other nodes within a few minutes. On

notification, the nodes execute the corresponding action and update themselves accordingly. All transactions are encrypted in order to protect the data.

The submission procedure

Authors send their manuscripts as TeX files, or one of its dialects, including figures in PostScript format, using an uploading procedure that is made available on a Web page of the journal.

Those who do not use a browser and its upload facility can submit papers in the requested format by ordinary e-mail or simply telling the robot the preprint number of the paper already available in the xxx-archives. The robot automatically assigns the paper to the appropriate editor according to the key words choosen by the author to characterize his/her work.

This is a dynamical process in which both the possible key words and their association to the editors are constantly up-dated.

On receiving the paper, the robot

- starts by processing the submitted work: it creates the PostScript file, runs routine checks that filter out junk submissions and, in the end, sends an acknowledgment back to the submitter via e-mail;
- puts the PostScript file of the paper on the editor's Web page of the editor;
- creates a Web page accessible by the authors (via a password chosen by the authors at the time of submission) where the status of the submitted paper will be constantly updated for perusal.

The refereeing procedure

The JHEP refereeing procedure is based on the traditional system in which an editor receives the submitted paper, examines it, asks one or more referees for an opinion and then acts accordingly. The confidentiality of both the submission and the identity of the referee are guaranteed.

JHEP is now one of the leading journals in the field. The editorial board will therefore apply a strict filter in selecting the submitted papers and only single out suitable ones. Hence, there will be a very high selection rate and referees and editors will have to comply with the strict standards recommended by the advisory board. The latter is composed of distinguished senior physicists who monitor the journal and review the editorial work.

The scientific policy of JHEP (e.g. the level of accepted papers) is jointly established by this committee and the editorial board.

The publishing procedure

The accepted papers are processed by the robot. The JHEP TeX style replaces those of the authors to format the papers in a uniform manner. It contains many ready-to-use shortcuts and facilities to help the authors in writing and proof-reading.

The paper is preliminarily posted on the author's Web page, where s/he will be able to check it and proof-read it. Subsequently, the paper is posted on its own Web page that will feature the title, the names of the authors and the institution as well as the abstract. On this page readers will have access to a DVI, a PostScript and a PDF version of the paper.

Papers are hypertexts: the different parts of a paper are linked within the article and to the papers quoted in the references and published in other journals that have electronic archives on the Internet.

We are also testing the possibility of visualising articles in JAVA. This option will allow to read papers interactively.

Periodically, the collection of published papers is sent to a publishing house in order to produce a bound hard-copy (and a CD-ROM) version of the journal. This is distributed by regular mail to subscribing libraries. The cost of the subscription is kept low. On the other hand, access to JHEP by electronic means is free of charge.

Proceedings via MBONE

Traditional printed journals often deliver "special issues" as proceedings of conferences and summer schools. Correspondingly, JHEP has a section devoted to the diffusion of seminars, conferences and summer schools which, unlike traditional proceedings, is truly interactive. The aim is to allow remote users to participate in lectures as if they were actually facing the speaker, recreating the classroom atmosphere: lectures are broadcast live on the Net, directly from the classroom, and anyone can receive the audio/video and possibly ask questions to the speaker out loud and in real time. Moreover, all participants share a virtual whiteboard, by which they can receive slides and other documents from the speaker, exchange opionions and remarks, and ask for explanations.

Market impact

Scientific communication has become instantaneous, with authors in many fields creating their personal library on their computers. Retrieval and printing with book quality is possible at very low costs. Obtaining papers tailored exactly on the individual requirements of any researcher is simple and avoids dealing with thousands of unnecessary pages.

At the same time, most libraries have been squeezed economically, and archival space problems have become a nightmare, demanding yearly additions of shelf space. As a consequence, in the last fifteen years most libraries have gone through the painful process of cutting subscriptions. Most have reached the point that their collections are seriously damaged. The US Association of Research Libraries calculates that its 114 member libraries spent 142 per cent more on journals in 1997 than 10 years before, but ordered 6 per cent fewer titles. In the same year Reed-Elsevier, the publisher of 1200 scientific journals, among which Nuclear Physics (the direct competitor of JHEP with a subscription rate of 12.000 US dollar), reported profits of 378 million US dollar.

Commercial publishers (particularly Reed-Elsevier, Springer, Academic Press) and learned societies

(like the American Physical Society and the British and German ones in Europe) have introduced electronic versions of their journals. Unfortunately, they have consistently linked their use to subscribing to paper versions or are planning to reintroduce page charges. The net effect is very high costs indeed.

JHEP has proved to be the right answer to the need for a new path for scientific communication. Indeed, JHEP is an efficient and cheap alternative to conventional publishing that nevertheless maintains essential publishing features: quality control, easy retrieval, and archival responsibility for the future.

In order to illustrate the success of the experiment, launched in July 1997, let the figures do the talking. JHEP is by now a leading journal in the field. The number of consultations is outstanding and the impact factor as high as the best in the field.

Table 1. Papers submitted per months

Month	**Papers**
January 2000 (until 25)	(40)
December 1999	51
November 1999	57
October 1999	40
September 1999	46
August 1999	40
July 1999	32
June 1999	43
May 1999	36
April 1999	43
March 1999	52
February 1999	30
January 1999	30
December 1998	45
November 1998	47
October 1998	37
September 1998	30
August 1998	31
July 1998	36
June 1998	29
May 1998	30
April 1998	21
March 1998	15
February 1998	12
January 1998	14

Table 2. Total papers submitted (January 25, 2000)

Submitted	957
Accepted	637 (34% revised)
Rejected	207 (26%)
Withdrawn	21

Table 3. Connections to JHEP nodes (January 25, 2000)

Period	**Successful web requests**
Last week (January 22)	7928
Average (since July 1997) per week	5916
Total (since July 1997)	611979

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Keywords

WWW databases, Electronic publishing, Scientific publishing and the market, Scientific refereed journals, High energy physics